

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/010484

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl<sup>7</sup> H01L21/314, H01L21/316, H01L21/205, H01L21/31, H01L21/3205,  
H01L21/768

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl<sup>7</sup> H01L21/314, H01L21/316, H01L21/205, H01L21/31, H01L21/3205,  
H01L21/768

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

|                           |           |                            |           |
|---------------------------|-----------|----------------------------|-----------|
| Jitsuyo Shinan Koho       | 1922-1996 | Toroku Jitsuyo Shinan Koho | 1994-2004 |
| Kokai Jitsuyo Shinan Koho | 1971-2004 | Jitsuyo Shinan Toroku Koho | 1996-2004 |

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                       | Relevant to claim No.      |
|-----------|--|----------------------------|
| X<br>Y    | JP 2001-135631 A (Matsushita Electronics Corp.),<br>18 May, 2001 (18.05.01),<br>Full text<br>& <u>US 2003/0025209 A1</u> | 1, 3, 6-8<br>2, 4, 5, 9-12 |
| Y         | JP 11-154672 A (Tokyo Electron Ltd.),<br>08 June, 1999 (08.06.99),<br>Full text<br>& EP 1035568 A1                       | 2, 4, 5, 9, 11             |
| Y         | JP 2002-299314 A (Tadahiro OMI),<br>11 October, 2002 (11.10.02),<br>Full text<br>& <u>US 2003/0168008 A1</u>             | 5, 13                      |

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search  
04 October, 2004 (04.10.04)

Date of mailing of the international search report  
19 October, 2004 (19.10.04)

Name and mailing address of the ISA/  
Japanese Patent Office

Authorized officer

Facsimile No.

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PCT/JP2004/010484

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                            | Relevant to claim No. |
|-----------|---|-----------------------|
| Y         | JP 11-330075 A (Tokyo Electron Ltd.),<br>30 November, 1999 (30.11.99),<br>Full text<br>& EP 1077486 A1        | 10-13                 |
| Y         | JP 10-144676 A (Tokyo Electron Ltd.),<br>29 May, 1998 (29.05.98),<br>Full text<br>& EP 0933802 A1             | 12                    |
| Y         | JP 2002-329682 A (Anelva Corp.),<br>15 November, 2002 (15.11.02),<br>Full text<br>& <u>US 2002/0157610 A1</u> | 12                    |

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## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The inventions according to claims 1 to 9, 10 to 12 relate to a method for forming a film, which comprises forming a fluorine-added carbon film by the use of a raw material gas containing C and F in an atomic ratio F/C of more than 1 and less than 2, and then modifying the resultant film by a radical.

The invention according to claim 13 relates to a substrate treating system involving the formation of a fluorine-added carbon film and the modification of the resultant fluorine-added carbon film, wherein the system has a treating chamber equipped with a planar microwave antenna.

(continued to extra sheet.)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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Continuation of Box No.III of continuation of first sheet (2)

The inventions according to claims 14 to 17 relate to a semiconductor device wherein a second metal film is so formed, prior to the formation of a first metal film, as to cover the side wall and bottom surface of the opening of a fluorine-added carbon film.